KEY TO THE SUBTRIBE HELOCHARÆ ORCHYM. (COLEOPTERA–HYDROPHILIDÆ) OF BOREAL AMERICA

BY FRED C. WINTERS
Santa Barbara, California

All tarsi five-jointed.......... 2

Middle and hind tarsi four-jointed.......... 4

2. Pseudo-basal joint of maxillary palpus curved, with the convexity to the front; mesosternum with a longitudinal lamina; elytra confusedly punctate.......... *Enochrus*

—. Pseudo-basal joint of maxillary palpus curved, with the convexity posteriorly; mesosternum at the most feebly protuberant 3

3. Labrum visible .... *Helochares*

—. Labrum concealed beneath clypeus, clypeus projecting laterally in front of the eyes to a great extent.......... *Helobata*

4. Mesosternal carina transverse or elevated at middle, forming a pyramidal or dentiform protuberance; maxillary palpi not longer than in *Enochrus*; tarsal claws simple.......... *Cymbiodyta*

—. Mesosternum with a compressed conical process; maxillary palpi long and slender; claws broadly toothed at base in male .... *Helocombus*

Genus ENOCHRUS (Thoms.) Zaitz.

Last two joints of maxillary palpi nearly equal in length.......... Subgen. *Enochrus* s. str.

Last joint of maxillary palpi always shorter than the preceding.......... 2

2. Series of coarser punctures on head and thorax indistinct or very much reduced.......... Subgen. *Methydrus* Rey

Series of coarser punctures distinct.......... Subgen. *Lumetus* Zaitz.

Subgenus ENOCHRUS Thoms.

Prosternum not carinate, piceous; sides of head and prothorax pale .... *cuspidatus* (Lec.)

Prosternum carinate 2

2. Piceous; head entirely, tips of last joint of maxillary palpi piceous; front angles of prothorax narrowly testaceous.......... *carinatus* (Lec.)

—. Prothorax and elytra rufo-testaceous, head piceous.......... *fucatus* (Horn)

Subgenus METHYDRUS Rey

Three species belonging to this subgenus have been described from our fauna. They are undoubtedly closely related to each other, and further studies may prove them mere variations. The mesosternal carina is feebly prominent, never laminiform.

Larger size, 3-4 mm. .... *ochraceus* (Melsh.)
Smaller size, 2.5-3 mm. .... *curialis* Knisch., *sublongus* (Fall)

E. ochraceus (Melsh.). Common in the New England States, rare in California. I have seen specimens from Kissena Lake, L. I.; Hackensack Meadows and Lakehurst, N. J.; Flatbush, Flushing, L. I. (Coll. Dow); Montgomery City, Md. (Coll. Shoemaker); Westport, Freetown and Stoneham, Mass. (Coll. Dodge); Riverside, Cal., June, in my collection; Richmond, Va., the specimens from this last locality being of smaller size, about 3 mm.

E. curialis Knisch was described in the Entomol. Anz., Jahr. IV, No. 5, from three examples of the stockholm Museum's collection from Carolina.

E. sublongus Fall, Bul. Brooklyn Ent. Soc., XXI (1926), p. 125, described as *Philhydrus elongatulus* Fall (new spec. of N. A. Hydrobiini) Jour. N. Y. Ent. Soc., XXXII (1924), p. 85, from specimens taken at St. Petersburg and Tarpon Springs, Fla., in which special reference was made to the extremely minute emargination of the last ventral segment.

Subgenus Lumetus Zaitz.

Professor Fall called attention to the fact that a number of species in this group have a small emargination at the apex of the last ventral segment, a character I shall make use of in the following table:

Last ventral segment emarginate at apex 2
Last ventral segment not emarginate 7

2. Prosternum carinate 3
—. Prosternum not carinate 4

3. Prothorax with a large discal piceous space........ *nigrellus* (Sharp)
—. Prothorax entirely testaceous ....
.... *nebulosus* (Say) and var. *pectoralis* (Lec.)

4. Anterior claws of male not distinctly toothed although with a basal angulation 5
—. Anterior claws of male distinctly toothed 6

5. Basal marginal line of prothorax distinct, maxillary palpi more or less piceo-testaceous, western.................... *californicus* (Horn)
—. Basal marginal line indistinct, maxillary palpi testaceous, large species, eastern .... *cinctus* (Say)

6. Large species, length 7-8 mm., maxillary palpi piceous............
.... *consors* (Lec.)
—. Smaller, 3.5-4 mm. .... *blatchleyi* Fall

7. At least one claw on each tarsus of male toothed........................ 8
—. Anterior claws of male not toothed, species piceous..................
....*perplexus* (Lec.)
8. Species piceous ....*conjunctus* (Fall)
—. Entire upper surface testaceous.......................*reflexipennis* (Zimm.)
—. Prothorax with a large discal piceous space, broader species
....*hamiltoni* (Horn)
—. Prothorax testaceous, head more or less piceous, narrower species .... *diffusus* (Lec.)

E. nigrellus (Sharp), Biol. Centr. Amer. Coleop., I (2), 1882, p. 68 (*Philhydrus*).

This is an addition to our list. Elliptical, convex, shining, brown to piceo-testaceous, head piceous with a paler space in front of each eye. Prothorax with a large piceous median space, sometimes shading gradually into the paler color of the sides, distinctly and moderately closely punctate, the arcuate and transverse series of coarser punctures and basal marginal line distinct. Elytra punctured similarly to the thorax, with the punctures less impressed toward the apex, the usual series of coarser punctures distinct. Body beneath piceous, opaque, prosternum strongly carinate, the carina more elevated in front, mesosternal lamina very prominent with an acute angle, femora piceous, tibiæ and tarsi rufo-testaceous, tarsal claws as in *ochraceus*, last ventral segment emarginate at middle. Length, 3.5-4 mm.

This species closely resembles *ochraceus* in shape and color, but is easily recognized by its carinate prosternum and strongly laminate mesosternal protuberance. From *nebulosus* it is separated by its color and the piceous space at middle of pronotum. My description is based on a series of twelve specimens from Riverside and Santa Barbara, California.

E. nebulosus (Say) occurs from Canada to Florida and westward to Indiana and California. I have seen specimens from Claremont, N. H. (Coll. Dow); Pinehaven and Rockaway Beach, L. I. (Coll. Shoemaker); Ithaca, N. Y. (Coll. Richmond); Nashville, Tenn. (Coll. Dodge); Paradise Key, Fla. (Schwarz and Barber); Tompkins Cove, N. Y.; Jekyl Island, Ga.; Porto Rico (Amer. Mus. Nat. Hist., N. Y.); and Richmond, Va.

The variety *pectoralis* (Lec.) is confined to southern California and is distinguished by the minute punctuation of the upper surface, and averages smaller in size and is less convex in form than typical *nebulosus*. It occurs in brooks, my specimens being from Ventura and Riverside, California.

E. californicus (Horn). This species resembles in form and color, *Cymbiodyta dorsalis* (Mots.), but is easily separated from that species by its generic characters. Specimens when not fully mature are brownish testaceous, but change to piceo-testaceous upon reaching maturity. The second maxillary palpus at basal half, and terminal joint at tip are darker, the coarser arcuate series of punctures on prothorax and basal marginal line are distinct, the coarser punctures of elytra indistinct, and the last ventral segment emarginate. This species seems to prefer standing water. My specimens are from Santa Barbara and Riverside, California.

E. cinctus (Say). This large piceous species could only be compared with *E. consors* (Lec.), but its testaceous maxillary palpi, indistinct basal marginal line and untoothed male claws will easily separate it. It prefers standing water and occurs, according to Doctor Horn, from Canada and the New England States south to Georgia and west to Kansas. Blatchley records it as throughout Indiana, and Leng and Mutchler, from Lake Worth and Lake Okeechobee, Fla. I have seen specimens from New Haven, Conn.; Lakehurst and Hackensack Meadows, N. J.; Flatbush, Rockaway Beach and Kissenor Lake, L. I.; Stoneham, Mass.; Chicago, Ill.; and the Catskill Mountains, N. Y.

E. consors (Lec.). The piceous maxillary palpi will separate this from the other members of its genus. I have seen specimens from Brookville and Lakehurst, N. J.; Pablo Beach, Fla. (Coll. Dodge); Writesville, N. C. (Coll. Davis); and Paradise Key, Fla. (Barber and Schwarz).

E. blatchleyi (Fall) is piceous black, formed nearly as in *nebulosus,* thorax somewhat paler, ventral apex with a minute emargination, protarsal claws of male each with a moderately strong, nearly rectangular basal tooth, and the prosternum not carinate. I have seen no specimens. Professor Fall records it from Dunedin, Tarpon Springs, and St. Petersburg, Fla.

E. perplexus (Lec.). This may easily be recognized by its piceous color, elongate form and non-emarginate last ventral segment. It is common from Canada to Florida. My specimens are from Hackensack Meadows, N. J.; Kissenor Lake, L. I.; Ottawa, Ont. (Coll. Beaulne); Writesville, N. C. (Coll. Davis), and Stone Mountain, Ga. (Cornell University).

E. conjunctus (Fall). According to Professor Fall, this species much resembles *E. carinatus* (Lec.) in color but is much smaller and less convex and, by the palpal characters, belongs to a different section of the genus. The claws are toothed somewhat after the manner of *E. hamiltoni* (Horn). It was described as from Lake Tahoe, California.

E. reflexipennis (Zimm.). This species may easily be recognized by its pale head and testaceous surface. It is a saltwater species found on the coast of Connecticut and Long Island. I have seen specimens from Norwalk and the saltwater marshes near New Haven, Conn., North Beach and the marshes of Rockaway Beach, L. I. (Coll. Shoemaker), and Staten Island.

E. hamiltoni (Horn). This species is as a rule more broadly oval than the following and the thorax has a large piceous space at middle. It is common in salt as well as fresh-water marshes and is recorded from Canada to Florida and westward to California. I have seen specimens from Rockaway Beach, L. I.; Staten Island; Yonkers, N. Y.; Chesapeake Beach, Md.; Tiverton, R. I.; Stoneham, Mass.; Orono, Me.; Chicago, Ill.; Wathena, Kan. (Coll. Dodge); Cornwall, Conn. (Coll. Chamberlin); and Paradise Key, Fla. (Schwarz and Barber). Professor Blatchley records it as frequent in Lake, Starke, and Luparte counties, Indiana.

E. diffusus (Lec.). This species while closely resembling *hamiltoni* is much more oblong in shape and has no thoracic piceous space, and the anterior claws of the male are more everted. Doctor Horn records it from Illinois, Dakota, Wyoming, Nebraska, and California. My specimens are from Santa Barbara, California, caught in marsh land along the seashore. It seems to be rare in collections and I have seen none from the Atlantic coastal regions.

Genus HELOCHARES Muls.

This genus differs from *Enochrus* by its maxillary palpi which are shaped like those of *Cymbiodyta,* from *Cymbiodyta* by its five-jointed middle and hind tarsi and slightly emarginate last ventral segment, and from both by having the clypeus more broadly rounded in front and the apex deeply emarginate, exposing the labrum to a larger extent. This is the only genus in the Hydrophilidæ, so far as known, where the female attaches its egg cases to the abdomen until the larvæ are hatched.

Two subgenera occur in our fauna, which may be separated as follows:

Elytra non-striate, sutural striæ absent, maxillary palpi very slender .... Subgen. *Helochares* s. str. Muls. (Kuw.)
Elytra with ten well-marked striæ, last joint of maxillary palpi at the most as long, and as a rule shorter than, the penultimate .... Subgen. *Hydrobaticus* W. McLeay

Subgenus HELOCHARES, s. str. Muls. (Kuw.)

H. sellæ Sharp. Broadly oblong, feebly convex; black above, shining, sides of clypeus in front of eyes, labrum, the side margins of prothorax and elytra reddish piceous; under surface dark piceous, antennæ, palpi and tarsi paler. Head distinctly punctate; clypeus emarginate with an irregular transverse series of larger punctures on either side near the front, clypeal suture marked by larger punctures; maxillary palpi very slender, piceo-testaceous, pseudobasal segment curved with the convexity posteriorly. Prothorax distinctly punctate, transverse series of coarser punctures very prominent, basal marginal line absent. Elytra distinctly punctate, punctures toward apex less deep with a distinct series of coarser punctures along the middle, and two others less distinct external to these; sutural striæ absent. Length, 5.5 mm.

This species was collected by Professor Blatchley at Dunedin, Florida, and described as *Philhydrus estriatus* Blatch. He had the kindness to send me a cotype, which I found to be *H. sellæ* Sharp, originally described by Doctor Sharp from Cordova, Mexico.

Subgenus HYDROBATICUS W. McLeay

The two species known from our fauna are separated as follows:

Mentum slightly emarginate at apex, arcuate series of coarser punctures on prothorax absent, eastern .... *maculicollis* Muls.
Mentum deeply emarginate, arcuate series of prothoracic punctures distinct .... *normatus* (Lec.)

H. maculicollis Muls. My specimens are from Richmond, Va. Doctor Horn records it from Ohio to North Carolina, Florida, and Texas; Professor Blatchley from Dunedin, Fla.; Leng and Mutchler from Eson River, Fla.; and Uhler from Washington, D. C.

H. normatus (Lec.) has, as Doctor Horn rightly observed, the mentum emarginate and the mesosternum feebly carinate and similar to *Enochrus ochraceus* (Melsh.). The subgenus *Chasmogenus* Sharp is founded on a species that is non-striate, except for the sutural striæ, with very long maxillary palpi, as long as head and pronotum together, with mentum deeply emarginate, and mesosternum carinate. The ten-striate elytra and comparatively short maxillary palpi place this species in *Hydrobaticus*, a view which has been taken by both Orchymont and Knisch. It occurs in the slowly flowing waters of southern California and seems not to object to warm springs. My specimens are from Ventura, Santa Barbara, Riverside, and Arrowhead Hot Springs, California. Doctor Horn records it from San Francisco southward into the Peninsula of California and eastward to Arizona.

Genus Helobata Bergr.

This genus is peculiar in having the labrum concealed under the clypeus; mentum transversely quadrate, its triangularly, apparently elevated, area at center slightly concave and with a small circular emargination in front, obliquely impressed on each side where it joins the submentum; maxillary palpi very long and in the specimens before me with a tendency to fold between the elevated triangular center and submentum; clypeus projecting laterally in front of the eyes to a great extent; prothorax and elytra broadly margined, the latter extending beyond the tip of the abdomen. According to Doctor Sharp, the anterior coxal cavities are closed behind by the junction of the epimera with the prosternal process, a character which isolates this genus from all other Hydrobiini although in other respects it is approached by various species of *Helochares*.

H. striata Brullé. This species has been known to us heretofore as *Helopeltis larvalis* Horn. I have two specimens before me from Florida which present the following characters: slightly piceous or somewhat testaceous in color; head and prothorax obsoletely rugulose, smoother at sides; apex of prothorax emarginate, arcuate series of coarser punctures absent; scutellum elongate triangular, scutellar striæ distinct; elytra obsoletely rugulose, explanate at sides, with ten punctate striæ, the last two close together, leaving a narrow interval between; the side margins wide, explanate; prosternum and mesosternum simple; last ventral segment emarginate at apex, the femora pubescent and tibiæ finely spinulose.

Doctor Horn records it from Louisiana and Sonora; Doctor Sharp from Guatemala, Paso Antonia, 4000 feet, and Cuba; Leng and Mutchler, Florida (Roberts' Coll.); Blatchley, Sarasata, Florida, March 4, beneath chunks of débris half buried in the mud of tide-water marsh; and Knisch, southern part of North America, West Indies, Central and South America.

Genus CYMBIODYTA Bedel

Elytra with distinct striæ.......... 2
Elytra without striæ (except the sutural).......... 6
2. All striæ entire, scutellar row of punctures distinct.......... *punctatostriata* (Horn)
—. Inner striæ much abbreviated.......... 3
3. Mesosternal ridge broadly conical, when viewed posteriorly.......... *fraterculus* Sharp
—. Mesosternal ridge straight or arcuate.......... 4
4. Apex of clypeus straight, second segment of maxillary palpi and tips of terminal segment darker, arcuate row of coarser punctures of prothorax well marked, elytra ochraceous, striæ feebly impressed with punctures less coarse than in the following.......... *imbellis* (Lec.)
—. Apex of clypeus arcuate-emarginate, maxillary palpi testaceous, arcuate series of prothorax reduced to a few coarser punctures, elytra piceous, border indefinitely paler.......... 5
5. Larger, 5-6 mm., coarser punctures of alternate intervals distinct.......... *morata* Horn
—. Smaller, 4-5 mm., coarser punctures of alternate intervals indistinct.......... *dorsalis* (Mots.)
6. Mesosternal ridge angularly elevated at middle or dentiform.... 7
—. Mesosternal ridge straight.......... 8
7. Broadly oval, mesosternal ridge pyramidal, large species, 6-7 mm.......... *rotunda* (Say)
—. Oblong oval, mesosternal ridge dentiform, smaller species.......... *minima* Not., *acuminata* Fall
8. Clypeus with a brown spot in front of each eye, pale margin of prothorax and elytra pronounced.......... *blanchardi* Horn
—. Clypeus piceous.......... 9
9. Coarser series of punctures of elytra absent.......... *lacustris* (Lec.)
—. Coarser series of punctures of elytra distinct.......... 10
10. Elytra widest at basal third, then conspicuously narrowed toward apex, giving the species when viewed from above an egg-shaped outline.......... *fimbriata* (Melsh.)
—. Form depressed, oblong, elytra widest at middle.... *vindicata* Fall

C. punctatostriata (Horn). This species has the clypeus strongly arcuate-emarginate at apex, sides of clypeus slightly explanate and paler in front of each eye, striæ entire, in these characteristics resembling *Hydrobaticus,* but the number of tarsal segments on the middle and hind tarsi will easily separate it from that subgenus. It is not rare in the mountain streams of the Coast Range of southern California. My specimens are from Camp Meeker, northern California, and Santa Barbara.

C. fraterculus Sharp. I have no specimens of this before me. Doctor Horn records it from southern Arizona well into Mexico.

C. imbellis (Lec.). This species is as a rule recognized by its brownish elytra, though in some cases its color approaches that of *dorsalis.* Its clypeus is narrowed toward apex in a slight curve with its front straight; its maxillary palpi are longer than in *punctatostriata* or *dorsalis,* with the second segment at base and terminal at apex darker. The arcuate series of coarser punctures of prothorax are very pronounced and the elytral striæ consist of much finer and only slightly impressed punctures as compared with *dorsalis.* Doctor Horn gives the number of entire striæ as five, but they are by no means constant. In my specimens from Camp Meeker five striæ are plainly discernible while in those from Santa Barbara they are reduced to two.

C. morata Horn and *dorsalis* resemble each other very closely. In both the clypeus is almost semicircular and slightly arcuate-emarginate in front, the prothoracic punctures of systematic value are very much reduced, and the maxillary palpi are shorter comparatively than in *imbellis.* I have found that the only way of separating *morata* from *dorsalis* is by its average larger size and the greater prominence of the coarse interstitial punctures. I have studied thirty specimens from Jemez Springs, Ariz. (Coll. Sherman), and three specimens from Yuma County, Ariz., June (Coll. Dow).

C. dorsalis (Mots.) seems to prefer mountain streams at lower altitudes and is common in southern California. My specimens are from Camp Meeker, Santa Barbara, Santa Cruz Island, Ojai, and Riverside.

C. rotunda (Say). This species is the most broadly oval of any in this genus. Of its maxillary palpi I can unfortunately say nothing, as they are both missing in the two specimens before me. The mesosternum has the transverse ridge broadly pyramidally elevated, and one of my specimens, a male, has the last ventral segment slightly emarginate at the middle of the apex, which is unique in this genus. It seems, while widely distributed, to be extremely rare in collections. My specimens are from Westwood, N. J., and Pennsylvania (collection by Henry Ulke in 1890). Doctor Horn records it from the Middle States as far south as North Carolina.

C. minima Not., Bul. Brooklyn Ent. Soc., XIV, 1919, p. 133. It was described from three specimens collected at Mooers, Clinton Co., N. Y., September, 1918. I have seen no specimens, but according to the description it is recognized by its small narrow form, 2.75-3.5 mm.; transverse row of coarser punctures of prothorax and rows of coarser punctures of elytra indistinct; nonstriate except for sutural striæ, with the mesosternal ridge strongly and acutely elevated at middle.

C. acuminata Fall, Journ. N. Y. Ent. Soc., XXXII, June, 1924. According to Professor Fall this species resembles in its general aspect smaller specimens of *C. vindicata* Fall or *Enochrus perplexus* (Lec.), with the pale margin of the prothorax extending narrowly across apex and vaguely inward for a short distance along base. The mesosternal transverse ridge is elevated into a long subconical acute spur.

C. blanchardi Horn. This species is easily recognized by its small broad form and pale space in front of each eye. It seems to prefer swift-running water. My specimens are from Ardsley on Hudson, N. Y., Halden, N. J., and Richmond, Va. Others seen were from Woodland, N. J. (Coll. Dow), Fairfax County, Va. (Coll. Shoemaker), Yonkers, N. Y. (Coll. Angel), and Cornwall, Conn. (Chamberlin).

C. fimbriata (Melsh.). We have to thank Professor Fall for the proper identification of this species which has long been confused with *vindicata* Fall or Zimmerman's *semistriatus*. *Fimbriata* is more convex, with elytra distinctly narrowed posteriorly almost from the basal fourth, and is much rarer than *vindicata*. My specimens are from Van Cortland Park, N. Y., and Westwood, N. J. Professor Fall records it from New Hampshire and Massachusetts.

C. vindicata Fall. This species is common from Canada to Texas. I have seen specimens from Kissenor Lake, L. I., Staten Island and Tompkins Cove, N. Y.; Secaucus, N. J.; Woodstock, Vt.; Monticello (U. S. N. M.); Tatowa, N. J.;

Claremont, N. H. (Coll. Dow); Ithaca (Coll. Richmond); Orono, Me. (Coll. Dodge); Cornwall, Conn. (Coll. Chamberlin); and Richmond, Va. This species has heretofore been known as *C. fimbriata* (Melsh.).

C. lacustris (Lec.). This species is of an oblong form, with coarser punctures of elytra absent and the transverse ridge of mesosternum short. It is not rare, occurring from Lake Superior to New England. My specimens are from Kissenor Lake, L. I., Hackensack Meadows, N. J., Cornwall, Conn. (Coll. Chamberlin), New Haven, Conn., Flatbush, L. I. (Coll. Shoemaker), and Framingham, Mass. (Coll. Dodge).

Genus HELOCOMBUS Horn

Tarsi heteromerous, maxillary palpi very long, curved as in *Cymbiodyta,* prothorax without basal marginal line, elytra deeply striate, resembling in form and structure *Hydrobius fuscipes* L., but easily separated from it, aside from its more important structural characters, by its long maxillary palpi.

H. bifidus (Lec.). Doctor Horn records it from Canada and the Lake Superior region and the New England States southward to Georgia. I have seen specimens from Forest Park, L. I., in a pool among leaf mold, Weehawken, N. J. (Amer. Mus. Nat. Hist., N. Y.), Fall River, Mass. (Coll. Dodge), Ottawa (Coll. Beaulne), and Staten Island, N. Y. (Coll. Davis). Professor Blatchley records it as frequent in the lakes of the northern half of Indiana.

NOTE ON WESTERN BULB FLIES

In the past the syrphid fly *Eumerus strigatus* Fall. has been designated as the lesser bulb fly or onion fly, but it now appears that there are at least three species of Eumerus in the western states, two of which are quite common. The bulb flies are of considerable economic importance, and a careful study of several thousand specimens reared from infected bulbs in Washington, Oregon, and California should yield some interesting results. The commonest species in California is *Eumerus tuberculatus* Rond. Experimental work with these flies is being carried on at the United States Bureau of Entomology Field Station at Santa Cruz.—F. R. Cole.